2008 Solar Annual Review Meeting

Session: CSP Advanced Systems – Advanced Overview
Company or Organization: National Renewable Energy Laboratory

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Session Presentations

Advanced Overview – Mehos (NREL)

Optical Materials – Kennedy (NREL)

PPG FOA High Value Materials – Winter/McCarney

3M FOA Hardcoats – Messner

SkyFuel FOA High Temperature Linear Fresnel – McMahan

Ausra CLFR Project Update – O'Donnell

Bright Source DPT – Woolard

Advanced Heliostats – Kolb (SNL)

Thermochemical Hydrogen Project – Siegel (SNL)

Information Requested from Presenters

Provide project overview

a) Project description
b) Major FY08 Activities
c) Planned Milestones
d) Budget Table (FTEs, $FTE, Subcontract Info)
e) Personnel contributing to the project

Link project to Program Plans & Goals

a) Solar Multi-year Program Plan
b) CSP Subprogram Goals
c) Joule Targets

FY08 Progress Report

- Accomplishments so Far
- Issues and Solutions
- Costs
- Projected Accomplishments (3rd and 4th Quarters)

Future Activities

- FY09
- FY10 and Beyond including “out of the box”

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Relationship to Solar Program Goals

"…to make CSP cost competitive in the intermediate power markets by 2015 (~7¢/kWh with 6 hours of storage) and in baseload power markets (~5¢/kWh with 16 hours of storage) by 2020."

Project Overview

Project description

- Supports crosscutting activities, e.g. advanced optical materials, that aren't tied to a single CSP technology
- Supports the "incubation" of new concepts in preliminary stages of investigation

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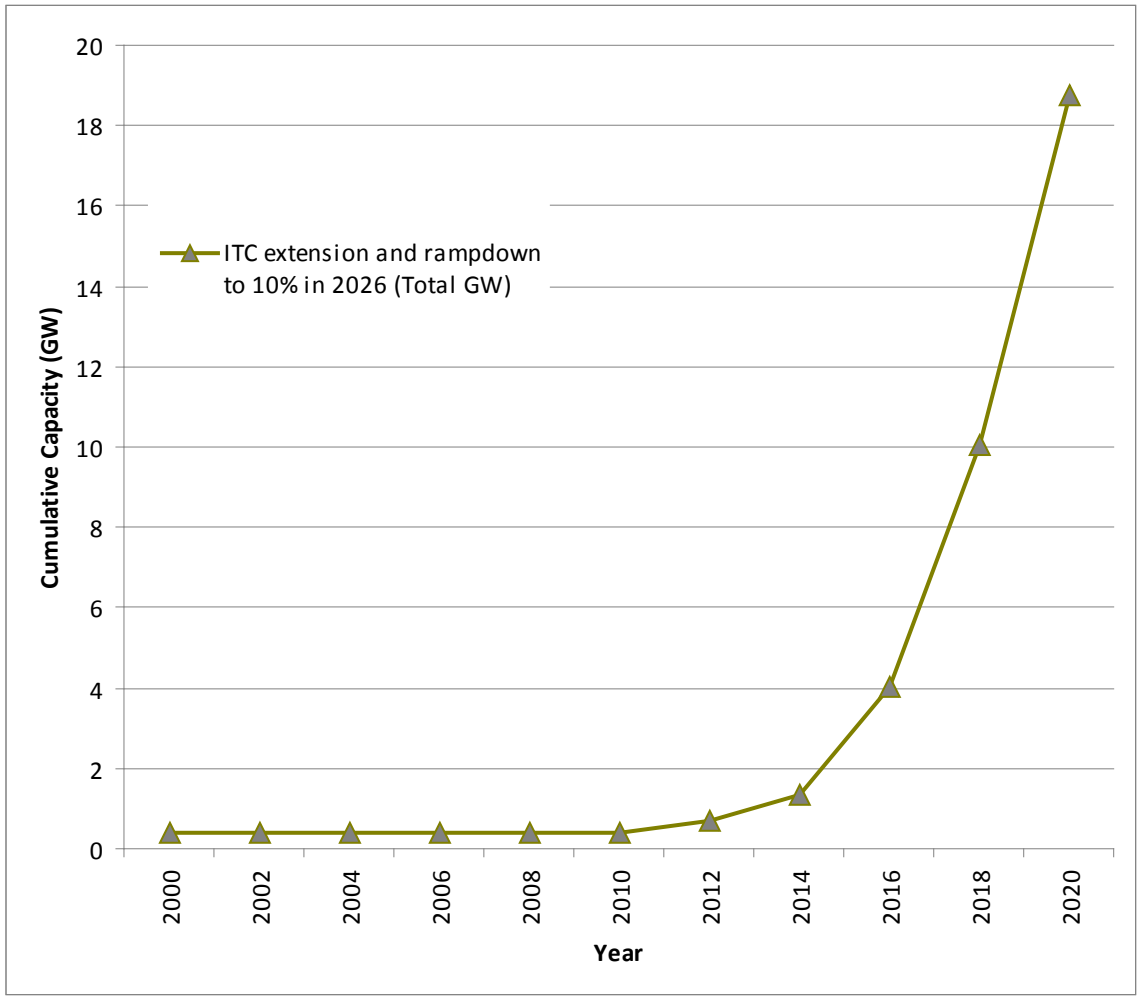
Why Advanced R&D?

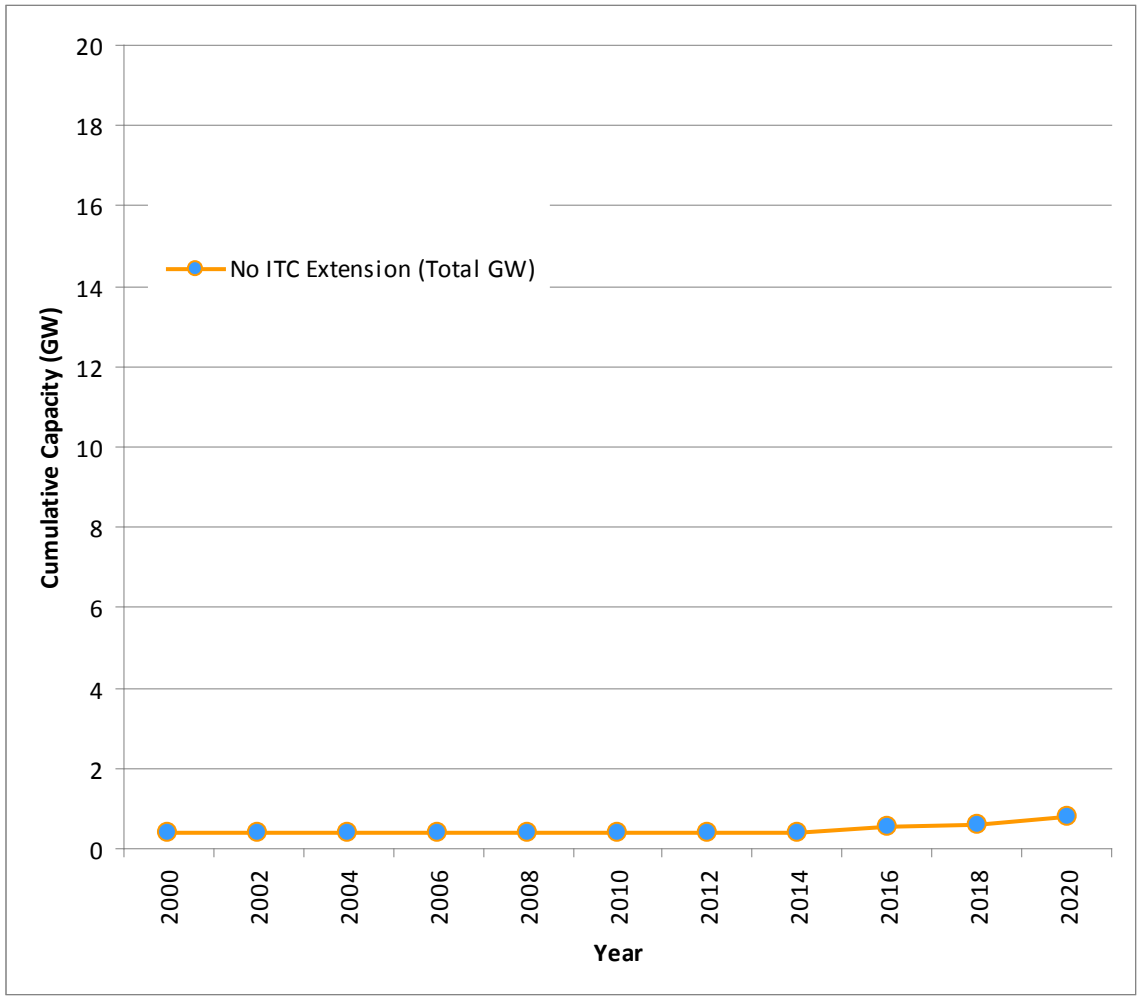
ReEDS* Model Projection of CSP Market Penetration
8-year Extension of 30% Solar Investment Tax Credit



*NREL Regional Energy Deployment System Model

Why Advanced R&D?

ReEDS* Model Projection of CSP Market Penetration
No ITC Extension



*NREL Regional Energy Deployment System Model

Major FY08 Activities

- Laboratory Advanced Concepts R&D
  - Mirror characterization and testing
  - CEC collaboration
  - CSP/CPV collaboration
  - SkyFuel trough test
  - Heliostat analysis
  - Power tower analysis
- CSP FOAs and Related Laboratory Support
  - PPG, SkyFuel, 3M, Hamilton Sundstrand,
- Thermochemical Hydrogen
  - Heliostat field upgrades – hardware
  - Heliostat field upgrades – software
  - Power tower analysis

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Major FY08 Planned Milestones for CSP Advanced Systems from CPS*

Milestone	Date	Status
Complete installation of new accelerated exposure chambers	March, 2008	June, 2007
Determine optical reflector goals consistent with current CSP program objectives.	March, 2008	To be revised
Compare the durability of silvered thin-glass copper-free and lead-free mirrors	June, 2008	On-Track
Annual status report on candidate solar mirror samples	September, 2008	On-Track
End of year report summarizing NREL advanced materials support to FOA awardees.	September, 2008	On Track

*Covers NREL/SNL milestones only. FOA awardees milestones under not included in internal DOE database

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FY08 Budget Table

Agreement	In-House $(K)	Subcontract $(K)	Total $(K)
Advanced Concepts R&D	843	400	1243
CSP FOA – Advanced Concepts	350	1362	1712
Thermochemical Hydrogen Earmark	2300	700	3000
Total Budget	3493	2462	5955

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Relationship to Solar Program Goals

FY08-FY12 Solar Multi-year Program Plan Goal

"To improve the performance and reduce the cost of solar energy systems to make solar power cost-competitive with conventional electricity sources by 2015, thereby accelerating large-scale usage across the Nation and making a significant contribution to a clean, reliable and flexible U.S. energy supply".

FY08 Joule Targets

Complete R&D that will increase efficiency on concentrating solar power devices resulting in a levelized cost of energy in the range of $0.11-$0.13/kWh (real $2006).

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Issues and Solutions (my own)

Issue:	CSP In-house non-FOA advanced R&D budget (not including thermochemical earmark) is $850K or 3% of the CSP budget.
Solution:	In-house advanced R&D budget should be increased to minimum 10% level
Issue:	FOA awardees will move from design to development & demonstration in FY09. Lack of in-house support for awardees may jeopardize success of FOA program
Solution:	Lab staff must carefully track FOA (and non-FOA) requests for technical support and T&E support. Awardees should track whether laboratory support and evaluation is sufficient to meet their needs.

Issues and Solutions

Issue: Competition with industry for both hiring and retaining laboratory CSP staff.

Solution: We must continue to offer a challenging and stimulating R&D environment for staff, balancing near-term needs of industry with long-term objectives of the program.

Future Activities

FY09 Planned Activities

- To be covered by individual presenters…
- Two scenarios
  - Level budget ($30M minus earmarks)
  - Initiative budget ($>50M?)

FY10 and Beyond Ideas

  - Discussion following session

Thank You!

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